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**FEE TRANSMITTAL  
for FY 2002**

Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT**

(\$)

**Complete if Known**

Application Number	09/891,757
Filing Date	June 26, 2001
First Named Inventor	Russell P Davis
Examiner Name	Pric, Richard Thomas, Jr.
Group Art Unit	3643
Attorney Docket No.	

**METHOD OF PAYMENT (check all that apply)**
☐ Check ☒ Credit card ☐ Money Order ☐ Other ☐ None
☐ Deposit Account:
 Deposit  
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The Commissioner is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) during the pendency of this application☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity | Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
101 740	201 370	Utility filing fee	
106 330	206 165	Design filing fee	
107 510	207 255	Plant filing fee	
108 740	208 370	Reissue filing fee	
114 160	214 80	Provisional filing fee	

**SUBTOTAL (1)**

(\$)

**2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE**

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	- 20** =	X	=
Multiple Dependent Claims	- 3** =	X	=

Large Entity | Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description
103 18	203 9	Claims in excess of 20
102 84	202 42	Independent claims in excess of 3
104 280	204 140	Multiple dependent claim, if not paid
109 84	209 42	** Reissue independent claims over original patent
110 18	210 9	** Reissue claims in excess of 20 and over original patent

**SUBTOTAL (2)**

(\$)

\*\*or number previously paid, if greater; For Reissues, see above

**FEE CALCULATION (continued)****3. ADDITIONAL FEES**

Large Entity | Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
105 130	205 65	Surcharge - late filing fee or oath	
127 50	227 25	Surcharge - late provisional filing fee or cover sheet	
139 130	139 130	Non-English specification	
147 2,520	147 2,520	For filing a request for <i>ex parte</i> reexamination	
112 920*	112 920*	Requesting publication of SIR prior to Examiner action	
113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action	
115 110	215 55	Extension for reply within first month	
116 400	216 200	Extension for reply within second month	
117 920	217 460	Extension for reply within third month	
118 1,440	218 720	Extension for reply within fourth month	
128 1,960	228 980	Extension for reply within fifth month	
119 320	219 160	Notice of Appeal	
120 320	220 160	Filing a brief in support of an appeal	
121 280	221 140	Request for oral hearing	
138 1,510	138 1,510	Petition to institute a public use proceeding	
140 110	240 55	Petition to revive - unavoidable	
141 1,280	241 640	Petition to revive - unintentional	
142 1,280	242 640	Utility issue fee (or reissue)	
143 460	243 230	Design issue fee	
144 620	244 310	Plant issue fee	
122 130	122 130	Petitions to the Commissioner	
123 50	123 50	Processing fee under 37 CFR 1.17(c)	
126 180	126 180	Submission of Information Disclosure Stmt	
581 40	581 40	Recording each patent assignment per property (times number of properties)	
146 740	246 370	Filing a submission after final rejection (37 CFR § 1.129(a))	
149 740	249 370	For each additional invention to be examined (37 CFR § 1.129(b))	
179 740	279 370	Request for Continued Examination (RCE)	
169 900	169 900	Request for expedited examination of a design application	

Other fee (specify)

\*Reduced by Basic Filing Fee Paid

**SUBTOTAL (3)**

(\$)

**SUBMITTED BY**

Name (Print/Type)	Russell P Davis
Signature	<i>Russell P Davis</i>

Registration No. (Attorney/Agent)	
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**Complete (if applicable)**

Telephone	757-390-0651
Date	9-10-2002

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09, 891, 757

InCompleted

## Application for Patent on "An Integrated System For Shellfish Production"

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<b>Inventor Name:</b>	Russell Patton Davis
<b>Citizenship:</b>	USA
<b>Inventor Residence and Correspondence Address:</b>	613 Mango Dr., Virginia Beach, VA 23452 <a href="http://www.Shellfish-Unlimited.com">http://www.Shellfish-Unlimited.com</a> <a href="mailto:Russell.P.Davis@Shellfish-Unlimited.com">Russell P. Davis@Shellfish-Unlimited.com</a>
<b>Invention:</b>	<b>AN INTEGRATED SYSTEM FOR SHELLFISH PRODUCTION:</b> Encompassing Hatchery, Nursery, Grow-out, Brood-stock Conditioning and Market Conditioning Phases; also Water Treatment, Food Supplement, Propulsion, Anchoring, Security, and Devices for the Integration of Neighborhood Values and Shellfish Production.
<b>Provisional Application:</b>	JUNE 28, 2000 60/214,458 SEPT 08, 2000 60/232,079 OCT 02, 2000 60/237,033 DEC 01, 2000 60/250,389 FEB 02, 2001 60/263,820
<b>Application filing Date:</b>	JUNE 26, 2001 09/891,757
<b>Art Unit: 3643</b>	<b>Examiner: Price, Richard Thomas, Jr.</b> FAX 703-305-7687 V. 703-308-2694/Sup. Peter Poon 308-2574
<b>PROSECUTION HISTORY:</b> <b>Responsive Claim Amendment Date</b> Sept 16, 2002	<b>Mr. Tom Price:</b> In response to the restriction requirement of 08/26/2003 #3807, the Applicant provisionally elects group IX in claim 9 with traverse via the additional <b>Generic &amp; Linking Claim 40</b> on page 80.  If this response is deemed non-responsive please grant an additional month to respond. Please bill as needed according

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GROUP 3600

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	to meet the required fees. Forms PTO-2038 & PTO/SB17 are enclosed.
No Attorney or Agent	No Government Agency has any ownership interest in this patent
<b>DECLARATION &amp; Small Entity Election:</b>  FAX RECEIVED  SEP 10 2002  GROUP 3600	I, Russell Patton Davis, am the sole inventor of this "INTEGRATED SYSTEM FOR SHELLFISH PRODUCTION: Encompassing Hatchery, Nursery, Grow-out, Brood-stock Conditioning and Market Conditioning Phases; also Water Treatment, Food Supplement, Propulsion, Anchoring Security, and Devices for the Integration of Neighborhood Values and Shellfish Production." The contents herein are true to the best of my knowledge and belief. The applicant is a small entity under the rules of the PTO.  Signed: <i>Russell P Davis</i>  Dated: <i>9/10/2002</i>

**OFFICIAL****TITLE OF THE INVENTION****An Integrated System for Shellfish Production:****Encompassing Hatchery, Nursery, Grow-out, Brood-stock Conditioning and Market Conditioning Phases; also Water Treatment, Food Supplement, Propulsion, Anchoring, Security, and Devices for the Integration of Neighborhood Values and Shellfish Production.****BRIEF SUMMARY OF THE INVENTION**

Shellfish aquaculture is a rapidly growing field that is increasingly constrained by the scarcity and cost of land based hatchery and nursery operations. The high capital and operating costs associated with these facilities along with their vulnerability to instances of low water quality and the scarcity of potential locations motivated the inception of this design. The strategies employed by this system have been borrowed from various species and the community interactions while the devices and processes to implement the strategies and integrate them into my political context are my own invention.

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blooms suppressed and the canal turned into a highly productive area for shellfish reproduction. This process is effected by the release of air bubbles from the bottom of the channel such that it creates a continual upwelling and current.

## GENERIC CLAIM 40

I claim as my invention "An Integrated System for Shellfish Production: Encompassing Hatchery, Nursery, Grow-out, Brood-stock Conditioning and Market Conditioning Phases; also Water Treatment, Food Supplement, Propulsion, Anchoring, Security, and Devices for the Integration of Neighborhood Values and Shellfish Production.

The general claim, conceptual invention and overall design paradigm behind of this invention of "An Integrated System of Shellfish Production" takes the simplex method of optimizing production processes and uses that algorithm to enumerate and rank the constraints on shellfish production, each of those constraints is the subject of a search in the domain of nature for instances where evolution has succeeded in relaxing that constraint for some species by some device - each behavioral or physiological device is contemplated so that it inspires the invention of human implementable devices that may be applied to that vector in the culture of shellfish. This systematic traversal of the problem domain (shellfish production) has produced the invention of this "Integrated System of Shellfish Production". The existing shellfish industry can only be completely re-invented. The orders of magnitude increase in productivity in several root vectors will graduate the industry from the sometimes less-than-civil hunter-gatherer stage into a terra-forming stage were the geology of the earth itself is compassionately sheparded. The inventive conceptual methodology resulted in this "Integrated System of Shellfish Production". Its parts are not subject to restriction and divisional patent as the inventions are not independent inventions according to MPEP 808.01 as the claims are connected by design, operation, and effect. There is only one art unit to examine this patent application. The parts are also linked as follows:

Claims 1, 2, 3, 4, 5, 7, 8, 9, 16 and 31 address distinct devices in the integrated system that emulate the various configurations of and benefits derived from fish gill parasitism in the glochidian nursery strategy of the freshwater pearly mussel. The claim 8 device additionally benefits from a tidal current management configuration derived from a soft coral called the sea pen or sea plum.

Claims 16 and 33 address devices within the Integrated System that emulate the marsupium of larviparous (ovolarviparous) shellfish.

Claim 23, 32, 34, 35 and 36 are devices needed to implement the device of claim 33. Claim 23's design was inspired by the mangrove tree propagule and the stinging nettles nematocyst. Claim 32's design was inspired by an egg raft that was probably produced by the marsh grass snail, *Littorina irrorata*. Claim 34's design was inspired by the 'rafting' behavior sometimes displayed by planktonic shellfish veligers in which the veligers appear to act as a school and form a vortex by their concerted motion that appears to act as a pump so that they might harvest more plankton from more water than the could achieve by individual action alone. This rafting behavior is not continuous and may occur only when food density drops or the oxygen gradient in the water makes the air-water interface hugging and surface water harvesting behavior advantageous.

Claim 21 is needed to implement Claim 32.

Claims 36, 37, 38 are process devices that allow humans to emulate ways in which shellfish modify their environment so that the shellfish become even more prosperous and resilient to misfortunes of weather.

Claim 17 is a process device that gives humans the ability to emulate ways in which weather and marine life reworks fine sediment in ways that are advantageous to the shellfish's health and pr sperity.

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Claim 24 is a process device that gives humans the ability to emulate ways in which the benefits of shellfish exposure to atmospheric exposure may be had while avoiding the detriments of atmospheric exposure.

Claim 39 remedies the pattern in estuary canal building where shore-margin construction creates environmental niches that are initially very attractive to shellfish yet the burst of vitality (which is highly valuable to the property owners) is naturally unsustainable and that has produced much in the way of counter productive blame making. Claim 39 is the result of the "Integrated System of Shellfish Production" constraint discovery and management. One of those constraints is political. The history of blame-laying without knowledge has made many waterfront land owners fearful of shellfish production. This must be changed for the implementation not to be hindered politically. Rapport and trust must be established with its neighbors on the waterfront. This is essential and integral to the successful implementation of the "Integrated System of Shellfish Production". Boundless ecological enhancement and restoration and the removal of causes for false blaming is the good neighbor strategy needed to achieve that rapport. The canals present many square feet of very desirable and scarce structural niches whose ecological value and vitality has been limited by transient moments of low oxygen and water flow. The invention of claim 39 acts to consistently remove that transient constraint for those canal owners that wish to do so. If any chose to do so, the "stickiness" in the blame on the remainder will diminish. Hopefully, this demonstrated willingness to be a good and useful neighbor will win many good neighbors in return. This claim addresses a distinct yet integral product of this "Integrated System of Shellfish Production". Outside of the context of the "Integrated System of Shellfish Production's" need for neighborliness the claim has insufficient economic value and the invention would be lost as no one has enough economic incentive to offer and publish the product.

Claims 10, 11, 17, 18 and 19 address the terra-forming products of the integrated system of shellfish production. These claims address distinct yet integral products that cannot exist outside of the context provided by the orders of magnitude increase in productivity within this "Integrated System of Shellfish Production".

Claim 22 intensifies the existing selection strategies of shellfish by amplifying the geochemical detriments to the shellfish immune strategies. Those c-lectin and mucus based strategies have been suitable for the geologically recent past but given the increased concentration of atmospheric carbon dioxide, increase frequency of storm sized waves in the summertime and increased shoreline erosion due to rising sealevels, greater flexibility in immune strategies will be needed by the shellfish if they are to prosper in these otherwise suitable niches. Claim 22's process device raises that challenge and selection pressure to match the increased breeding productivity and resulting opportunities for selecting from great genetic diversity. Without the context of the "Integrated System of Shellfish Production" where it is reasonable to manage a twenty-five billion veligar spawn, increasing larval selection pressure to the point where only one in one million survive would be equivalent to killing all the larvae. This selection process only has value within the context and breeding capacity achieved within the "Integrated System of Shellfish Production".

Claim 20 is the functional inverse of Claim 22 and is integral to the system in its market and broodstock conditioning phases.

Claims 12, 13, 14, 15 and 29 addresses the needs integral to the "Integrated System of Shellfish Production" where the high number of shellfish at a high density requires an inexpensive method of supplementing shellfish feed and enhancing the immune competence of the shellfish. If these distinct features were removed from the system the shellfish grown in it would face a greater risks of starvation stress and disease. Moreover the great number of shellfish coming to market from the system would tend to crash the market unless their quality was known to be greater than that from conventional production. The features offered to the "Integrated System of Shellfish Production" by these claims, and Claim 6, are so essential, integral, and distinct that the "Integrated System of Shellfish Production" would likely be a financial failure without them.

Claims 25, 26, 27, 28 and 30 are process devices that enable the "Integrated System of Shellfish Production" to be integrated with the culture of a symbiotic cohort of species to effect great economy and convenience that cannot be

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achieved without that Integration. Moreover the swam spawning enabled by the process device of Claim 31 and 33 would be much less economic and have much greater capital requirements and much greater risk to that capital without the integration of Claims 25, 26, 27, 28 and 30 into the "Integrated System of Shellfish Production".

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